CLAIMS

1. A method of riveting a first metal member to a second metal member for forming an automotive vehicle structure, comprising the steps of:

(a) providing a piercing rivet having a central axis, a generally disk-shaped head portion and an annular portion extending outwardly from a bottom surface of the head portion wherein;

(i) the annular portion defines a cavity;

(ii) a plurality of passages extend through the annular portion; and

(iii) an adhesive in a flowable state is disposed in the cavity of the annular portion;

(b) placing a first metal member on a second metal member, wherein each of the members has a first side and a second side, and at least a portion of the second side of the first member is in overlapping contact with at least a portion of the first side of the second member for forming an overlapped region;

(c) placing the first and second metal members between a rivet assembly including a punch and a die having a cavity; and

(d) driving the rivet through the first metal member and at least partially through the second metal member in the overlapped region wherein;

(i) the annular portion of the rivet is deformed radially away from the central axis of rivet to interferingly secure the rivet to the members thereby attaching the members to each other; and

(ii) the adhesive is forced out of the cavity of the rivet through the plurality of passages of the rivet thereby positioning the adhesive between an outer annular surface of the rivet and portions of the first member and the second member; and

(e) curing the adhesive to adhesively secure the rivet to the first and second members.

2. A method as in claim 1, wherein the rivet is formed of at least one metal alloy including a base metal selected from the group consisting of steel, aluminum and magnesium.

3. A method as in claim 1, wherein the punch is electrically actuated for driving the rivet through the members.

4. A method as in claim 1, wherein the adhesive is an epoxy that cures at temperatures from about 130°C to about 220° C.

5. A method as in claim 1 wherein the adhesive is curable in less than 60 minutes.

6. A method as in claim 1 wherein the first and second members are formed of aluminum.

7. A method as in claim 6 wherein the adhesive is additionally located between a portion of the members after driving of the rivet.

8. A method of riveting a first metal sheet to a second metal sheet for forming an automotive vehicle structure, comprising the steps of:

(a) providing a piercing rivet having a central axis, a generally disk-shaped head portion and an annular portion extending outwardly from a bottom surface of the head portion wherein;

(i) the annular portion includes an outer annular surface and a sharpened piercing edge;

(ii) the annular portion includes an inner annular surface at least partially defining a substantially cylindrical cavity within the annular portion;

(iii) a plurality of passages are radially disposed in the annular portion and extend from the inner surface to the outer surface; and

(iv) an adhesive in a flowable state is disposed in the cavity of the annular portion;

(b) stacking a first metal sheet on a second metal sheet, wherein each of the sheets has a first side and a second side, and at least a portion of the second side of the first sheet is in overlapping contact with at least a portion of the first side of the second sheet for forming an overlapped region;

(c) placing the first and second metal sheets between a rivet assembly and a die, the rivet assembly including a punch, the die having a cylindrical cavity with a protrusion extending into the cavity; and

(d) driving the rivet through the first metal sheet and partially through the second metal sheet in the overlapped region wherein;

(i) the annular portion of the rivet is deformed radially away from the central axis of rivet to interferingly secure the rivet to the sheets thereby attaching the sheets to each other; and

(ii) the adhesive is forced out of the cavity through the passages of the rivet thereby positioning the adhesive between the outer annular surface of the rivet and portions of the first sheet and the second sheet;

(e) curing the adhesive to adhesively secure the rivet to the first and second sheets.

9. A method as in claim 8 wherein the rivet is formed of at least one metal alloy including a base metal selected from the group consisting of steel, aluminum and magnesium.

10. A method as in claim 8 wherein the punch is electrically actuated for driving the rivet through the sheets.

11. A method as in claim 8 wherein the adhesive is an epoxy that cures at temperatures from about 130°C to about 220° C.

12. A method as in claim 8 wherein the adhesive is curable in less than 60 minutes.

13. A method as in claim 8 wherein the first and second sheets are formed of aluminum.

14. A method as in claim 13 wherein the adhesive is additionally located between a portion of the sheets after driving of the rivet.

15. A rivet for riveting a first metal sheet to a second metal sheet for forming an automotive vehicle structure, comprising:

(a) a generally disk-shaped head portion disposed about a central axis and having a substantially flat top surface and a generally conical bottom surface;

(b) an annular portion centered about the central axis and extending outwardly from a bottom surface of the head portion wherein;

(i) the annular portion includes an outer annular surface and a sharpened piercing edge;

(ii) the annular portion includes an inner annular surface at least partially defining a substantially cylindrical cavity within the annular portion; and

(iii) a plurality of passages are radially disposed in the annular portion and extend from the inner surface to the outer surface; and

(c) an adhesive in a flowable state is disposed in the cavity of the annular portion such that the adhesive may be forced through the plurality of passages to

adhesively secure to the outer annular surface of the rivet and to the first and second sheets.

16. A rivet as in claim 15, further comprising a plurality of channels defined in the inner annular surface of the rivet, each of the channels extending from adjacent the bottom surface of the head portion to one of the plurality of passages.

17. A rivet as in claim 15, wherein the rivet is at least partially formed of steel.